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Abstract

This paper examines whether the subjective well-being of migrants is responsive to fluctuations in macroeconomic conditions in their country of origin. Using the German Socio-Economic Panel for the years 1984 to 2009 and macroeconomic variables for 24 countries of origin, we exploit country-year variation for identification of the effect and panel data to control for migrants' observed and unobserved characteristics. We find strong (mild) evidence that migrants' well-being responds negatively (positively) to an increase in the GDP (unemployment rate) of their home country. That is, we originally demonstrate that migrants regard home countries as natural comparators and, thereby, suggest an original assessment of the migration's relative deprivation motive. We also show that migrants are positively affected by the performances of the German regions in which they live (a 'signal effect'). We demonstrate that both effects decline with years-since-migration and with the degree of assimilation in Germany, which is consistent with a switch of migrants' reference point from home countries to migration destinations. Results are robust to the inclusion of country-time trends, to control for remittances sent to relatives in home countries and to a correction for selection into return migration. We derive important implications for labor market and migration policies.

Key Words : Migrants, well-being, GDP, unemployment, relative concerns/deprivation.

JEL Classification : C90, D63

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1 Introduction

Studies using self-reported measures of life satisfaction as proxies for utility have rapidly developed during the last decade (see the reviews of Frey and Stutzer, 2002; or Clark et al., 2008). This new branch of the economic literature allows for testing important determinants of individual well-being that could not be easily studied with the revealed preference approach. For instance, this is the case with the "macroeconomics of happiness", i.e., how movements in GDP, unemployment or inflation directly affect individual happiness (Clark and Oswald, 1994; Oswald, 1997; Di Tella et al., 2001, 2003; Wolfers, 2003). This literature has also established the importance of status and positional concerns, notably the influence of a person's relative income compared to a reference group on her welfare.[1]

While it is difficult to identify the relevant reference point for a given population, migrants offer an interesting case study. Indeed, they are confronted with different potential reference groups among which two are natural comparators, namely their countries or regions of origin and the regions of destination. While there is some evidence regarding the role of positional concerns within a country,[2] the impact of home-country economic performances on the well-being of international migrants is, to date, not investigated. This question is not only relevant to measure the determinants of migrants' well-being. It could also shed light on the international dimension of life satisfaction, on the assimilation process of international migrants and on the migration decision itself. In particular, the closely related concept of relative deprivation is often cited in the migration literature to explain the very choice of migrating (e.g., Stark and Taylor, 1991).[3] To our knowledge, the literature has not yet studied relative deprivation (and the net gains from migrating) using subjective well-being measures as well as whether home countries are relevant reference points for international migrants.

This study aims to fill this gap by providing the first investigation of whether migrants are sensitive to the economic performances of both their home country and destination locations. Using the German Socio-Economic Panel (GSOEP), we exploit time and home country variation to identify the effects of macroeconomic fluctuations on migrants' well-being. Germany is interesting for at least two reasons. First, it has one of the highest population of immigrants in Western countries,

[1] See Easterlin (1995) and evidence from neuroscience (Dohmen et al., 2011), experimental economics (Johansson-Stenman et al., 2002) or subjective well-being (e.g., McBride, 2001, Ferrer-i-Carbonell, 2005, Luttmer, 2005, Senik 2004, Clark and Senik, 2010, among others).

[2] For instance, Akay et al. (2012) show that rural-to-urban migrants in China have strong competing feelings towards their home regions.

[3] That is, migration is being undertaken because it can improve a person's income relative to members of her reference group, which in this literature is assumed to be other income-earning persons in the source country or source community.

with almost 13% of the total population coming from various countries of the Eurasian continent (a total of 10.7 million migrants from 194 countries live in Germany). Second, the GSOEP is a large representative dataset including subjective well-being (SWB) measures, very detailed individual and household information, a panel dimension and excellent representativeness of migrants. Additionally, we recover information on macroeconomic conditions over 26 years for 24 origin countries that correspond to the largest migrant communities in Germany.[4] This information is combined with migrants' SWB and other individual characteristics from the GSOEP. We then estimate migrants' SWB on a large set of individual determinants of well-being (household income, health status, etc.) and the macroeconomic variables of home countries, while accounting for migrants' family circumstances in both the host and home countries, individual time-invariant unobservables, time trends, country fixed effects, arrival cohort and German states fixed effects. Our results are robust to the inclusion of country-specific time trends, the amount of remittances sent to relatives in home countries and a correction for possible non-random selection into return migration.

Exploiting the unique setting offered by migrants, this study contributes to the literature with at least three findings: it originally shows that home countries indeed act as a natural comparator for migrants, it highlights the existence of multiple reference points, and it indicates possible switches in reference groups over the years-since-migration or sorting across migrants depending on their degree of assimilation. The first point is our main result: we find a marked and statistically robust effect of the home countries' macroeconomic conditions on migrants' well-being. It is fully in line with the relative concerns/deprivation hypothesis, i.e., migrants' well-being *decreases* with home country GDP per capita. The second contribution starts with the finding of an effect of opposite direction regarding local economic performances, i.e., migrants' well-being *increases* along with the GDP of the German counties in which they live. We interpret it as signal effect, i.e., destination regions with greater economic success indicate higher chances of prosperity for migrants in the future. The third finding is obtained when estimating an heterogeneous effect of GDP on migrants' well-being, along dimensions like years-since-migration and objective and subjective measures of the degree of assimilation in Germany. We unveil that competing feelings

[4] Another recent study, Nekoei (2013), exploits time and origin-country variation to study the effect of exchange rate volatility on migrants' labor supply in the US. The author uses 16 years of the Current Population Survey and 73 countries of origin. Our study also relates to Di Tella et al. (2001, 2003). These authors do not focus on migrants especially; they study the correlation between all citizens' SWB and the country's macroeconomic fluctuations. They use individual data collected from 12 European countries between 1975-1991 and from the United States between 1972-1994. They report that GDP (unemployment and inflation) is positively (negatively) associated with citizens' well-being. They explain this correlation with feelings of national prestige (for GDP), corroding purchasing power (for inflation) and loss of self-esteem, depression, anxiety and social stigma (for unemployment). See also Di Tella and MacCulloch (2008) and Frey and Stutzer (2002).

towards home countries decrease after some years in the host country. Consistently, less assimilated migrants keep strong transnational ties, and origin countries are likely to remain their key reference group. Our conclusions are reinforced by the finding that the signal effect from German regions where migrants live also declines with years-since-migration. Indeed, it is likely that this effect is gradually replaced by relative concerns, i.e., the "local league" becomes the new reference point. We derive important labor market and migration policy implications from these results.

The paper is organized as follows. Section 2 presents the data and the empirical methodology. Section 3 reports the main results, robustness checks and additional results using migrants' heterogeneity. Section 4 concludes.

2 Empirical Approach

2.1 Data and Selection

Our analysis is based on the German Socio-Economic Panel (GSOEP), a well-known survey of individuals in households living in Germany. It has been used in important analyses in the SWB literature (see, e.g., van Praag et al., 2003; Frijters et al., 2004a, 2004b; Ferrer-i-Carbonell, 2005). It is a representative survey of the entire German population with about 25,000 individuals per wave and an exceptionally long panel, of which we are using 26 years from 1984 to 2009. It contains a wealth of information at the individual or household level, including data on education, health, labor market conditions and incomes, as well as various subjective measures of well-being. The dataset was started in 1984 in West Germany and has covered the entire reunited Germany since 1990. The latest survey we use was conducted in 2009 and we shall verify in our robustness checks whether the two years of recession (2008-2009) have a specific effect on our results.[5]

In each wave, the survey asks the question "*How satisfied are you with your life as a whole, all things considered*?". The answer is then recoded on an 11-point scale (0 signifies "*completely dissatisfied*" and 10 means "*completely satisfied*"). Life satisfaction is highly correlated with other subjective measures of well-being like self-reported happiness or aggregated answers about mental health such as the GHQ-12 (see Clark and Oswald, 1994). Most importantly, Clark et al. (2008) and Frey and Stutzer (2002) recall that SWB information is a solid proxy for individual well-being as demonstrated by its use among psychologists and other social scientists over the past thirty years, as well as by the strong correlation with further objective measures of mental well-being

[5]Sample weights are provided and used to guarantee the representativeness of the sample. Representativeness of the migrant population is found to be excellent in the detailed assessment of Lelkes and Zolyom (2010). Attrition in GSOEP is discussed in Spiess and Kroh (2004) and, in relation with SWB estimations, in Frijters et al. (2004b). Non-random attrition due to return migration is addressed in our analysis below.

(evidence from neuroscience, validation exercises on the tendency to smile genuinely, to commit suicide, to be rated as happy by friends and relatives; see Oswald and Wu, 2010). Krueger and Schkade (2008) provide extensive evidence about the robustness of SWB measures compared to more usual data used by economists. Di Tella et al. (2003) also report the high regularity observed in SWB equation regressions across different nations (as we do below for the different migrant groups in our data). Finally, the lack of interpersonal comparability in the perception of (and answers about) well-being should not be a concern: like any other source of measurement error, it is addressed by using large samples and, additionally, by controlling for individual fixed effects in SWB regressions. Equivalent income measures can also be derived, offering a more interpretable and (interpersonal) comparable index of well-being.

We select all the waves of the GSOEP, keeping all adult first-generation immigrants aged 16 or older and living in West or East Germany. Although more than a hundred nationalities are reported, we restrict our study to the main migration groups, resulting in 24 different countries of origin. These correspond to the largest groups in terms of their population size in Germany and countries for which we have at least 100 observations in the data. We combine our GSOEP selection with macroeconomic variables for the migrants' 24 countries, drawn from annual time series data of the World Bank indicators. We focus on the main variables of interest, including log real GDP per capita of country h in year t (denoted $GDP_{h,t}$ hereafter), growth in real GDP per capita (denoted ΔGDP), log nominal GDP per capita (denoted $GDP^{nom}_{h,t}$), price levels measured by the GDP deflator ($P_{h,t}$) and unemployment rates.[6] The resulting sample includes a total of $51,171$ individual×year observations obtained over 26 years of data and migrants from 24 origin countries.[7] We lose a small fraction of this dataset due to missing information so that our final sample contains $47,557$ individual×year observations. In the following, we suggest estimations based on this microdata as well as grouped estimations on a sample of 556 country×year points.[8]

[6] See http://data.worldbank.org/indicator.

[7] For a comparison, DiTella et al. (2003) use 17 years of data and individuals from 13 countries to capture enough regional and time variation in macroeconomic conditions

[8] We do not have observations in GSOEP for 1 year (5, 5, 6 and 10 years) in Iran (Portugal, Russia Ukraine and Kazakhstan respectively), which makes 27 country × year observations missing. We have checked that the conclusions of this study hold when excluding these countries completely. In addition, macroeconomic variables are not reported in World Bank Indicators for 6 years in Poland, Slovenia, Macedonia, Croatia and the Czech Republic, 1 year for Russia and 10 years for Bosnia, leading to another 41 missing points. Again, we have verified that our results are consistently similar when using linear extrapolation or other sources to fill in the missing GDP or unemployment information. Our baseline nonetheless relies on the original sample. The total of 68 missing points corresponds to 10.9% of the $26 \times 24 = 624$ country × year sample used for grouped estimations below. This proportion is smaller in terms of individual×year observations (7.1%) due to the fact that missing points affect countries that are below the average country size.

2.2 A First Look at the Data

Table A.1 in the Appendix provides some statistics for the main macroeconomic indices (real GDP per capita expressed in PPP-adjusted 2005 international dollars, nominal GDP per capita and unemployment rates in columns 1, 2 and 4) and SWB (average value by country of origin over all migrants in GSOEP, in column 5), using mean values over the period 1984 to 2009. The last row shows the figures for Germany as a comparison point. We also provide the ratio of real GDP per capita for each country compared to Germany (column 3). This reflects the huge variation in development levels across immigration countries. For instance, the difference is as little as 30% (resp. 28%) of the German real (resp. nominal) GDP per capita for Iran and up to 113% (resp. 99%) for the Netherlands. A lot of variation can also be observed concerning reported well-being. On the $0-10$ scale, SWB scores 7.1 on average over all years and countries. Using the country average over 1984-2009, we see that SWB varies from 5.8 for Iranian migrants to 7.6 for Dutch migrants, partly reflecting the large variation in living conditions (as proxied by $GDP_{h,t}$) across nations. This is illustrated by the cross-country correlation between mean SWB and absolute real GDP (resp. unemployment rate), i.e., .46 (resp $-.40$). However, differences in income levels do not perfectly explain the well-being gap. The relationship between income and well-being may not be linear: beyond a certain income level, income differences have smaller effects on perceived well-being (this pattern is found in Easterlin, 1995, but questioned more recently by Stevenson and Wolfers, 2008, who do not reject linearity). For instance, the correlation between mean SWB and real GDP per capita is smaller when GDP is expressed in logs (.36). Moreover, if we focus on Western European countries and the US, this correlation drops to .07.

Next, we report country-specific correlations between yearly SWB and GDP (resp. unemployment), in column 6 (resp. 7) of Table A.1. We use variation in annual SWB (calculated as the mean SWB over all migrants of a country for a given year) and GDP over time. Interestingly, for GDP (resp. unemployment), the correlations are negative (resp. positive) in the majority of countries, as if increases in GDP per capita (resp. unemployment) were associated with a decline (resp. rise) in the well-being of the corresponding migrants. This unexpected result is illustrated in Figures 1 and 2 for the five largest migrant groups (those from Turkey, Greece, Italy, Spain and Poland). That is, we plot log real GDP per capita (Figure 1) and unemployment rates (Figure 2) against mean SWB for all our panel years. While GDP increases steadily over the period, SWB shows a clear declining trend. That is, the negative relationship between home country GDP and migrants' SWB seems to characterize the whole period (with a few exceptions) and most immigration countries.[9] The pattern for unemployment rates is not as pronounced as it is for GDP.

[9]This result is not only driven by the periods of economic growth. While not visible in Figure 1, we observe in source data that, for instance, the downturns of 1993-1994 and 2000-2001 in Turkey or the 2008-2009 recession in Italy are associated with an increase in SWB among migrants from these countries.

Yet overall, it seems as though increases in unemployment rates are associated with an increase in SWB.

These preliminary results directly align with the interpretation in terms of relative concerns/deprivation suggested in the introduction. With the Easterlin paradox (Easterlin, 1995), the fact that a country like Germany has experienced GDP growth yet a flat trend in SWB over the past 30 years often pertains to the classic explanation in terms of "positionality". That is, after some point, well-being would depend more on relative income than on absolute income, so that absolute increases in national wealth would not improve well-being over time. For migrants, one could in fact expect an even more radically opposed trend between GDP and SWB, i.e., a negative correlation as we illustrate here. Migrants' reference points for relative concerns are indeed countries which are more often poorer than Germany. If these countries "catch up" with Germany due to higher growth rates (for instance in Turkey), the relative position of migrants declines over time compared to their country's living standards, and thus, their SWB is negatively affected. In the sequel, we attempt to characterize these effects by means of regressions on grouped or micro data and controlling for additional variables.[10]

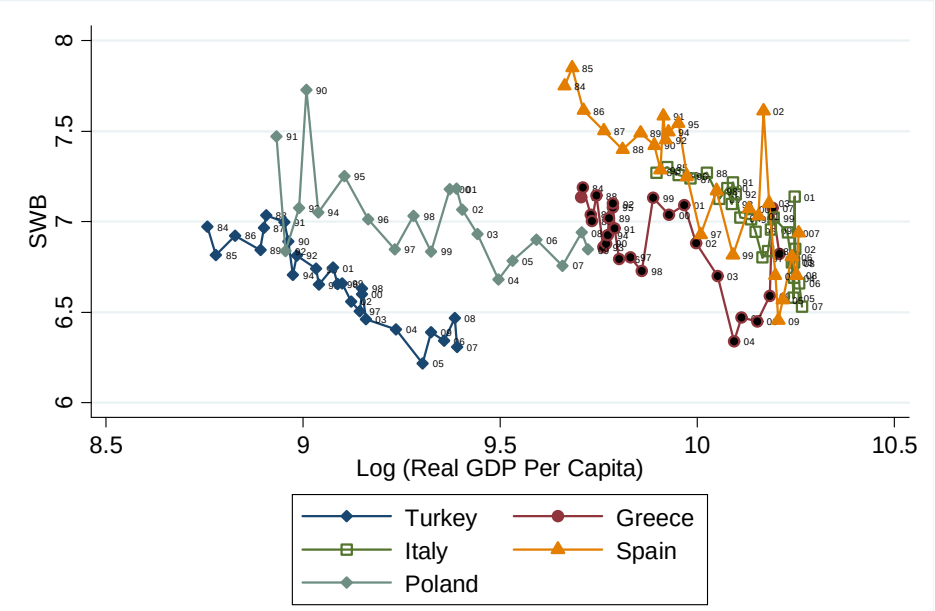
2.3 Modeling the Well-being of Migrants

Estimations on Grouped Data. We begin our analysis by estimating the relationship between key macroeconomic measures and SWB using grouped data. That is, we produce a dataset of 556 country×year points as described above, using the mean SWB over all migrants in a country-year cell. At this stage, we aim to examine the magnitudes, signs and the statistical significance of the macroeconomic indices while exploiting time variation but without controlling for any individual variation. We estimate the following model:

$$\begin{aligned} \overline{SWB}_{ht} &= \overline{X}_{ht}\alpha + \gamma Macro_{ht} + \epsilon_{ht} \\ \text{with } \epsilon_{ht} &= \delta_h + \theta_t + \varepsilon_{ht} \\ \text{or } \epsilon_{ht} &= \delta_h + \theta_t + \eta_{ht} + \varepsilon_{ht}. \end{aligned} \tag{1}$$

where $\overline{SWB}_{ht}$ is the mean subjective well-being over all migrants of origin country h in year t. We use different home country-specific macroeconomic variables $Macro_{ht}$ as discussed in the

[10] Note that when the negative relationship between SWB and GDP over time is cumulated with the positive relationship across countries, we obtain a positive but moderate correlation of 0.204 (second to last row of Table A.1). As shown in the following, this positive sign does not hold when further controlling for migrant's income levels and other individual characteristics. That is, the negative effect of home country GDP on well-being may well be obtained by time variation within countries, as shown with aggregated trends above, but also when accounting for cross-country variation.



Figures indicate years; GDP per capita come from the World Bank Indicators and SWB (Subjective well-being) from the GSOEP (life satisfaction question).

Figure 1: SWB versus GDP: Time Trends

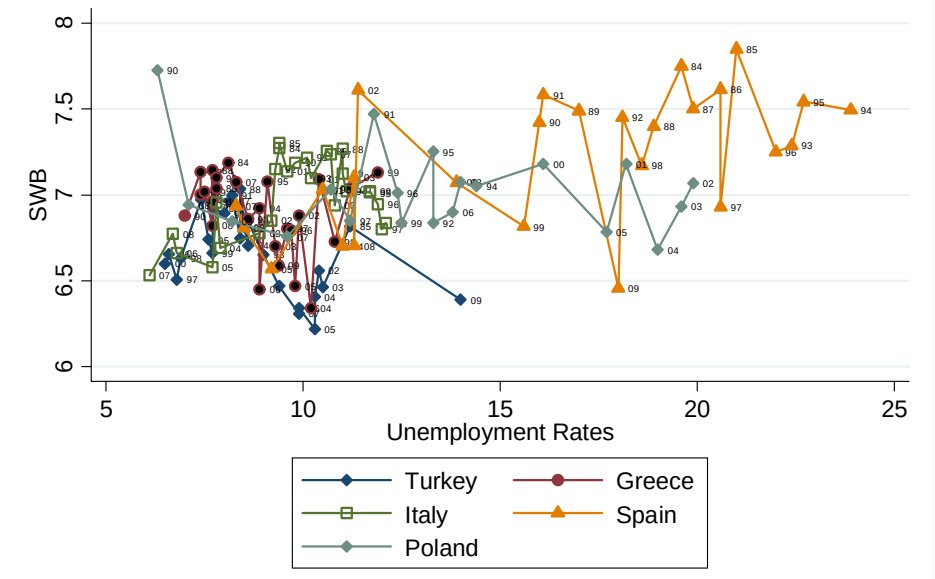


Figure indicate years. Unemployment rates are taken from the World Bank Indicators and SWB (Subjective well-being) from the German Socio-Economic Panel (life satisfaction question).

Figure 2: SWB versus Unemployment: Time Trends

previous section. In our favorite specification, we also control for a set $\overline{X}_{ht}$ of mean characteristics of migrants from country h observed in year t, which include average age, marital status, work status, health status, household income and time spent in Germany (years-since-migration). The composite error term ϵ_{ht} is discussed below.

Estimations on Micro Data. Using our selected panel of migrants living in Germany, we estimate the well-being SWB^* of migrant i from home country h at time t as follows:

$$\begin{aligned} SWB^*_{iht} &= X_{it}\alpha + \gamma Macro_{ht} + \epsilon_{iht} \\ \text{with } \epsilon_{iht} &= \delta_h + \theta_t + \varphi_i + \varepsilon_{iht} \\ \text{or } \epsilon_{iht} &= \delta_h + \theta_t + \eta_{ht} + \varphi_i + \varepsilon_{iht}. \end{aligned} \tag{2}$$

Latent well-being SWB^* is considered as a proxy for the unobserved utility of a migrant, for which we observe an ordinal metric $SWB_{iht} = j$ on an ordered scale of well-being categories $j = 1, ...J$. The model combines both characteristics of migrant i at year t, X_{it}, and macroeconomic variables of her home country h at year t, $Macro_{ht}$. Individual time-varying variables in X_{it} include the usual determinants of SWB, i.e., age, marital status and family circumstances, work status, health status, log household income and years-since-migration (which may capture the role of assimilation in overall well-being). We also include German states (*Länder*) as means to account for possible migration patterns within Germany (evidence in GSOEP shows, however, that geographical mobility of migrants is extremely limited, see Akay et al., 2013). Finally, we control for time-invariant variables including gender and cohort effects. Migrants may vary in unobservable characteristics depending on the year they arrived in Germany (Borjas, 1999). Therefore, migrants are grouped into 9 cohorts taken 5 years apart (9 dummy variables starting from pre-1960 arrivals until the last cohort corresponding to the last 10 years). These cohort dummies aim to capture cohort-specific unobserved characteristics affecting migrants' well-being.[11]

Stochastic Specification and Estimations Methods. The residual term is specified in a similar way in models (1) and (2). It includes home country fixed effects δ_h (for unchanging cultural influences of origin country on reported well-being), time trends θ_t (for any global shocks that are common to all countries in each year), and a usual i.i.d error term, ε_{ht} in (1) and ε_{iht} in (2). For a robustness check, we augment our basic specification with country-specific time

[11] Grouping is necessary for identification. Indeed, there are four 'time dimensions': migrants' age, duration of stay in Germany (years-since-migration), year dummies (year of observation) and cohorts (year of arrival). The last three cannot be identified without additional assumptions, since the year of observation minus the year of arrival equals years-since-migration. Our choice is therefore to introduce age (a usual determinant of SWB), years-since-migration (which is correlated with the level of assimilation) and time trends in the most flexible way while reducing cohorts to grouped effects.

trends $\eta_{ht} = \delta_h \times \theta_t$. This may capture, for instance, cultural attitude toward changes in well-being or country-specific unobservable assimilation patterns of migrants of country h. Di Tella et al. (2003) stress that for usual unit-root reasons, untrended SWB should not be regressed on trended macroeconomic indices like GDP. Deterministic functions of time are used to render the data stationary. This is accounted for by general time trends θ_t and, in the robustness checks, by the inclusion of the country-specific time trends η_{ht} (this point is further discussed in the results section). Microdata estimations using model (2) additionally include an individual effect φ_i that accounts for time-invariant unobservables (fixed or random effects). Our baseline estimations rely on the Mundlak-Chamberlain "correlated effects" model, also known as the "quasi-fixed effects" (QFE) model. The auxiliary distribution of individual effects is specified using *within-means* for the following time-variant variables: household income, household size, age, amount of remittances sent to the home country, education and working hours. Most importantly, this model allows for the inclusion of individual effects without losing crucial fixed effects, such as country effects, German states and immigrant arrival cohorts. Fixed effects (FE) estimations are also conducted for a comparison.

Finally, the ordinal nature of the dependent variable in model (2) requires a brief discussion regarding the appropriate estimation method. In fact, we consider that $J = 10$ is large enough to treat reported well-being as a continuous variable so that (2) can be estimated linearly. The advantage of the linear approach is that it makes the required extensions to panel estimations much more transparent and allows including unobserved individual heterogeneity in a flexible way (Diener et al., 1999). Notwithstanding, Ferrer-i-Carbonell and Frijters (2004) show that results are typically similar using both linear and ordinal models, a conclusion that is shared in the present study. In addition, we provide checks where we acknowledge the ordinal nature of the dependent variable. We also allow for unobserved individual effects in this nonlinear context by using the QFE ordered probit and the "Blow-up and Cluster" FE ordered logit estimators (see Baetschmann et al., 2011).

3 Results

3.1 Estimations on Grouped Data

We first begin with the linear estimation of model (1) on grouped data, i.e., ignoring individual variation in the GSOEP. Because we control for country dummies δ_h, the effect we obtain over all country×year cells can be interpreted as a within-group effect. In Table 1, we simply report estimates for γ, which is the impact of the macroeconomic variables on SWB. We focus on the

two main macroeconomic indicators: log real GDP per capita ($GDP_{h,t}$) and unemployment.[12]

Effect of GDP. Column I reports the coefficient on $GDP_{h,t}$. The parameter estimate is negative and highly significant, with a magnitude of $-.668$ and a standard error of 0.204. An increase in the home country's GDP per capita is negatively correlated with migrants' well-being, conditional on country and year fixed effects. These preliminary results may indicate a negative effect of home country performances on migrants' well-being, yet we do not claim any causal interpretation at this stage. Also, this estimation assumes a common time trend in SWB after controlling for country-specific macroeconomic variables. In column II, we suggest another estimation that accounts for country-specific time trends of SWB. The relationship between $GDP_{h,t}$ and SWB is hardly affected, as the coefficient is $-.583$ and still significant at the 5% level. This is all the more remarkable as such a specification demands much from the data. It is nonetheless a necessary check, as argued by Di Tella et al. (2003). Indeed, as macroeconomic indices such as GDP are time-trended while SWB is usually untrended (Easterlin, 1995), regressing the latter on the former generates concerns of costationarity. In our sample of migrants, we have observed a small downward trend in life satisfaction. We nonetheless account for time trends θ_t in the estimation to reduce this concern. Including country×year effects – and hence accounting for possible differences in slope across source countries – should eliminate it.
Moreover, the GDP effect could also be spurious if country-specific time effects, and in particular the effect of years-since-migration, were misspecified and picked up by the GDP trend. While country-specific time trends eliminate this, we have checked that our results are not sensitive to using flexible specifications of years-since-migration in a model without country-specific time effects (our specification in the rest of the paper is a quadratic form of years-since-migration).
A final check has consisted in using the Hodrick-Prescott filter to detrend the macroeconomic variables before estimation. This approach ensures that the results are not due to trend generating spurious correlation between GDP and SWB (Hodrick and Prescott, 1997). Using a specification where we also include time dummies, we obtain an effect of $-.722$ (standard deviation of .357) for detrended GDP per capita in levels and $-.534$ (.312) for detrended GDP per capita in logs. These are statistically significant and the log GDP effect is close to the baseline estimate.

Interpretation and Comparisons. There are several ways to judge the magnitude of the effect. Results of column I can be interpreted as follows: Given that SWB and $GDP_{h,t}$ have a total standard deviation equal to 1.78 and .17 respectively (cf. Table A.1), then a one standard deviation increase in $GDP_{h,t}$ (which is around a 2% increase compared to the mean) accounts for a decline of 6.4% of a standard deviation in SWB (or a 1.6% decrease in mean SWB). This

[12] In all the estimations hereafter, we use the log of real GDP per capita divided by $10,000$, for comparability with Di Tella et al. (2003).

figure is 5.6% when we control for country-specific time trends. While this may seem modest, it is very much in line with measures of relative concerns or socio-economic status in the literature. For instance, Di Tella et al. (2010) find that a one standard deviation change in status (i.e., an individual's relative standing to others measured by job prestige) explains 3.1% of the standard deviation in well-being, and that this effect is about half the size of a one standard deviation decrease in log household income. In our case, an alternatively way to gauge the effect is precisely to take the ratio of the coefficient on log GDP per capita over the coefficient on log household income in order to calculate an *equivalent income* variation. The coefficient on the log household income (averaged over all migrants of each country) varies between .37 and .31 depending on the model specification (respectively without and with country-specific time trends).[13] Taking the ratio of the coefficients on log GDP and log household income, we obtain an equivalent income of around -1.8 in models I and II (see lower panel of Table 1), i.e., a 1% increase in the home country's real GDP per capita is equivalent to a 1.8% decrease in household income. Drawing from estimates of absolute and relative income effects in the literature, we find smaller equivalent income measures of relative concerns, yet in the same order of magnitude, i.e., $-.58$, $-.76$, $-.82$ in Akay and Martinsson (2011), Ferrer-i-Carbonell (2005) and Luttmer (2005) respectively. Larger values are found in Akay et al. (2012) for Chinese internal migrants as the SWB change due to a 1% increase in the mean income of rural regions of origin is equivalent to a 3.3% decrease in rural-to-urban migrants' household income.

Effects of Unemployment. Our relative concerns/deprivation interpretation could apply to other macroeconomic variables and notably to unemployment. Market failures that constrain labor market and earnings opportunities in the home land may increase the attractiveness of migration both as a potential avenue for effective gains in relative incomes and a source of satisfaction for those who have already migrated. Column III in Table 1 presents the effect of the home-country unemployment rate. This effect is significantly positive, which is consistent with the interpretation above and the findings regarding GDP. This effect is robust to controlling for home country-specific time trends (column IV). When including $GDP_{h,t}$ in the same regression (column V), both home country log GDP per capita and unemployment effects keep the sign and magnitude that they had in independent estimations. Admittedly, there is a small decrease in the magnitude of the GDP effect, likely due to the substantial correlation that exists between these macroeconomic variables ($-.36$). Notwithstanding, this effect is remarkably robust. Both effects become slightly smaller

[13] This is similar to comparison studies like Akay and Martinsson (2011), Ferrer-i-Carbonell (2005), Luttmer (2005), McBride (2001) or Di Tella et al. (2010) who report .36, .25, .12, .13 and .20 respectively. For (rural-to-urban Chinese) migrants, Akay et al. (2012) report .10. Note the finding of similar or even larger relative income effects compared to absolute income effects is not unusual (see for instance Senik, 2008; Akay et al. 2012; or McBride, 2001).

when country-specific time trends are included (column VI). In terms of equivalent income, the GDP effect in column V (resp. VI) corresponds to a 1.22% (resp. 1.28%) decrease in the mean household income.

Table 1: Effect of Home-Country Macroeconomics on Migrant SWB: Grouped Estimations

SWB grouped estimations	I	II	III	IV	V	VI
GDP	-0.668 ***	-0.583 **			-0.525 **	-0.468 *
	(0.204)	(0.256)			(0.206)	(0.259)
Unemployment rate			0.040 ***	0.030 ***	0.035 ***	0.027 **
			(0.010)	(0.011)	(0.010)	(0.011)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Home country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Home country-specific trends	No	Yes	No	Yes	No	Yes
GDP (equivalent income)	-1.81	-1.85			-1.23	-1.28
R2	0.583	0.671	0.587	0.673	0.593	0.676
# observations	556	556	556	556	556	556

Note: *, ** and *** indicate significance levels at 10%, 5% and 1% respectively. GDP refers to log of real GDP per capita. GDP and unemployment rates taken from World Bank indicators. Subjective well-being (SWB) averaged per country of origin x year, taken from the German Socio-Economic Panel. Linear estimations performed on migrants from 24 countries over 26 years, weighted by countryxyear cell size.

3.2 Estimations on Micro Data

Previous estimates suggest that macroeconomic performances within migrants' home countries could affect their well-being in a way which is consistent with relative concerns/deprivation. Grouped estimations avoid much of the noise surrounding data on individual SWB data. In particular, individual differences regarding the perception of one's own SWB are averaged up. However, grouping observations in a pseudo-panel does not allow us to control for migrants' individual heterogeneity, which potentially plays an important role. Thus we move to our main results, namely the estimation of model (2) which accounts for the true panel nature of the sample. It relates the macroeconomic conditions of home countries to individual SWB conditional on various individual and family circumstances in both the host and home countries. Estimates of coefficient γ are reported in Tables 2 and 3 for $GDP_{h,t}$, and Table 4 for unemployment.

Effect of GDP: Baseline Estimations. Before discussing our core results, we undertake a brief discussion of the complete set of estimates for equation (2), as reported in Appendix Table A.2. We distinguish between personal determinants of SWB, individual characteristics related to home countries and macroeconomic variables. For simplicity, we only report three specifications: one without GDP, one with GDP and one with GDP and dummies for country-specific time trends.

All specifications control for migration cohort, German state, home country and year effects, as well as individual unobserved heterogeneity using the Mundlak-Chamberlain QFE in a linear model. Model 0 contains only personal characteristics as in standard SWB regressions, in order to check the signs and significance of the usual socio-economic and demographic characteristics. Results are in line with standard findings in the literature (as surveyed in Frey and Stutzer, 2002; or Clark et al. 2008).[14] We have also run separate regressions for each country and find that life satisfaction estimates have a broadly common structure overall (detailed results are available from the authors). The impact of variables like age, income, health, marital status and children is very comparable and stable across countries of origin. This regularity suggests that SWB data contain reliable and potentially interesting information for welfare measurement (see also Di Tella et al., 2003).

In models I and II of Appendix Table A.2, we additionally include home country log real GDP per capita ($GDP_{h,t}$) to comply with the baseline specification in equation (2). We first observe that the signs and significance of individual characteristics are not affected much by the inclusion of this macroeconomic variable. Most importantly, we obtain an estimate of the GDP effect of $-.280$, which is significant at the 1% level.[15] Model II additionally controls for country-specific time trends, i.e., our second baseline specification in equation (2). Recall that this is an important check because country-specific time effects clean out the spurious correlation between macroeconomic indices and SWB, as previously discussed. The magnitude of the effect is basically unchanged ($-.224$) but the effect is less precisely estimated, even if still significant at the 10% level. Alternatively, we have also used the Hodrick-Prescott filter to detrend macroeconomic variables before estimations (detailed results available from the authors). Doing so, we obtain an effect of $-.303$ (standard deviation of .145) for detrended GDP per capita in levels and $-.256$ (.137) for GDP per capita in logs. Hence, results are still significant in this case and the log GDP effect is of similar magnitude as in the baseline.

[14] Essentially, income, good health and being married are positively related to SWB while being unemployed is negatively correlated. The pattern of SWB over the life cycle exhibits the classic U-shaped behavior, meaning that well-being decreases until the age of 40-45 and then increases. The presence of the kids or the spouse in Germany has strong positive effects. Migrants' refugee status does not affect SWB while the level of remittances is negatively correlated, indicating that the loss of resources endured by the migrant dominates the gains from remitting (altruism, investment in social capital in home country, etc.). Yet it is only significant in specifications without QFE (not reported), not when QFE includes mean remittances over all years as we model it.

[15] In all specifications, we cluster standard errors at the individual level due to the panel nature of the data. Alternatively, clustering is made at the year and home country level to account for possible bias due to repeated observations for the same country of origin (and to control for the correlation between errors in the same country). The standard errors are increased only slightly in both cases.

Interpretations and Comparisons. This finding confirms the grouped estimations results and suggests that macroeconomic movements in home countries feed through into migrants' feelings of well-being. This may be seen as an unexpected result if one believes that migrants are likely to be bounded to home lands by a sense of pride, identity and patriotic ties; they may also be linked altruistically or emotionally. We argue that such positive attachment and solidarity with the home country may exist when it comes to non-economic aspects like environmental catastrophes, anti-democratic events, conflicts and social unrest, and so on (we provide some suggestive evidence in the next section). As far as economic conditions are concerned, our results do consolidate previous findings in the literature showing that people's well-being is evaluated against natural comparison points – and we show that home countries are an important one. This also relates to the fact that mean income in home countries is a marker with respect to which migrants can gauge the success of their migration experience. It may come to mind that such a positional concern vis-à-vis home countries can be mitigated by the fact that some of the migrants' close relatives still live there and may be negatively affected by macroeconomic shocks. In fact, our microdata control for close relatives remaining in the home country and for the level of remittances sent by migrants to help face income shocks (see Appendix Table A.2).[16]

Hence, the negative coefficient on log GDP per capita may be seen as a reasonable measure of (economic) relative concerns vis-à-vis the home countries. Migrants from countries characterized by better macroeconomic performances experience lower gains from migration and, other things being equal, lower levels of well-being. Arguably, this effect may be attenuated when migrants decide to stay forever in Germany or become assimilated enough for their reference point to shift from home countries to other comparators within Germany. We investigate this point a bit later. For now, we suggest a brief comparison of our results with grouped estimations and other studies. First, point estimates are substantially smaller than in grouped estimations. A one standard deviation increase in log GDP per capita (which is around a 2% increase in the mean) is associated with a decline of 2.7% of a standard deviation of SWB (or a 0.7% decrease in mean SWB). This figure is 2.2% when we control for country-specific time trends. These values are much closer to the status effect in Di Tella et al. (2010) quoted above. Nonetheless, notice that confidence intervals of estimates from grouped versus microdata estimations do overlap, i.e., the 95% interval for model I (without country-specific time trends) is for instance $[-1.07, -.27]$ in the former and $[-.48, -.08]$ in the latter. Second, positional concerns are now smaller in magnitude than the effect of log household income (.39 in model I and .40 in model II). This leads to the following equivalent income calculations: a 1% increase in real GDP per capita in the home

[16] Whether the migrants' families increase their status within the origin country as the result of remittances is an interesting question. Yet it is beyond the scope of our research since we lack information on these families' position in the origin country's income distribution. See the discussion in the concluding section.

country is equivalent to a .71% (resp. .56%) decrease in household income. This is smaller than the equivalent income variations from grouped estimations but very similar to the relative concerns measures cited above, drawn from the studies of Ferrer-i-Carbonell (2005), Akay and Martinsson (2011) and Luttmer (2005).[17]

Effect of GDP: Alternative Estimators and Specifications. Our baseline results above are obtained with linear estimations – treating SWB as a continuous variable – including QFE à la Mundlak. In the previous section, we have justified the choice of this estimation approach, yet we now investigate the sensitivity of our results with respect to alternative estimators. Baseline estimates for the GDP effect are again reported in columns I and II of Table 2, without and with country-specific time trends respectively (we report both point estimates and the equivalent income effect). In column III, we acknowledge the ordinal nature of observed SWB data ($0-10$ scale) and use an ordered probit model. Results are very similar to the baseline (-0.215) and significant at the 1% level.

In addition, we can replace Mundlak QFE by standard individual fixed effects (FE). This is done in column IV using linear estimation and in column V using a discrete model (the "Blow-up and Cluster" FE ordered logit). Reassuringly, the effect is still strong and significant in both cases. Notice that the interpretation of parameter estimates is different in these models. If we reason in a time-demeaned linear model, age and year effects are not separately identified. Also, important time-invariant characteristics such as country fixed effects, immigration cohorts and German states (to the extent that within-Germany mobility is close to nil) are swept away together with variables such as gender or refugee status. Nevertheless, the magnitude of the effect is similar to previous findings in the linear estimation (-0.277). In contrast, the coefficient becomes twice as large with the FE ordered logit (-0.479). In fact, the coefficient on log household income also increases in this case (.48 compared to .38 in FE linear estimations). Consequently, equivalent income effects are not much larger than in the baseline: $-.73$ using model III and $-.99$ in model IV, compared to $-.71$ with model I.

A possibly harmless way to control for individual heterogeneity in SWB estimations is to use information on personal traits. Psychological traits are increasingly used as a time-invariant and potentially important determinant of well-being (Boyce, 2010) or used to account for individual differences in SWB perception (see Bollinger et al., 2012). We enrich the QFE linear model with the so-called "big five" personality traits reported in waves 2004 and 2009. Results are reported in column VI of Table 2.[18] The effect is again very stable, with a significant negative coefficient of a similar magnitude to past results ($-.321$) and a similar equivalent income effect ($-.86$).

[17] That country level coefficients are greater than the micro level coefficients may indicate the presence of country

Table 2: Effect of Home-country GDP on Migrant SWB: Micro Data

SWB micro estimations	I	II	III	IV	V	VI
GDP (coefficient)	-0.281 ***	-0.224 *	-0.215 ***	-0.277 **	-0.479 **	-0.321 ***
	(0.104)	(0.130)	(0.057)	(0.110)	(0.188)	(0.122)
Individual effects (a)	QFE	QFE	QFE	FE	FE	QFE#
Cohort fixed effects (b)	Yes	Yes	Yes	n.a.	n.a.	Yes
State fixed effects (c)	Yes	Yes	Yes	n.a.	n.a.	Yes
Year fixed effects	Yes	Yes	Yes	n.a.	n.a.	Yes
Home country fixed effects	Yes	Yes	Yes	n.a.	n.a.	Yes
Home country-specific trends	No	Yes	No	No	No	No
Estimation method	linear	linear	oprobit	linear	ologit	linear
GDP (equivalent income)	-0.714	-0.562	-0.689	-0.729	-0.991	-0.860
R2 or pseudo-R2	0.284	0.285	0.085	0.192	0.103	0.305
# observations	47,557	47,557	47,557	47,557	47,557	25,306

Note: *, **, *** indicate significance levels at 10%, 5% and 1% respectively. Estimations performed on migrants from 24 countries over 26 years, standard errors clustered at the individual level. GDP refers to log of real GDP per capita, taken from World Bank indicators. Subjective well-being (SWB) taken from the German Socio-Economic Panel. All models include the full set observed characteristics reported in appendix Table A.2 (except time-invariant characteristics in models IV and V). (a) Unobserved individual effects are taken into account using quasi-fixed effects (QFE), QFE with big-five personality traits (QFE#) or fixed effects (FE). With FE, year fixed effects are not identified since we include age in the covariates. Other individual effects are: (b) 10 arrival cohort effects, (c) 16 federal states of Germany.

Effect of GDP: Timing and Adaptation. Table 3 reports additional results. The first investigation concerns the timing of the effect. It may be the case that migrants are affected by the *dynamics* of their country's economic performances more than its actual level. We introduce the potential role of GDP growth, ΔGDP, alone or together with $GDP_{h,t}$ (columns 1 and 2 of Table 3). It bears negative signs, indicating that an acceleration of migrants' relative deprivation negatively affects their well-being; yet it is not significant. The baseline GDP effect remains significant when introduced simultaneously with GDP growth (column 2). A more flexible way to account for dynamics is to introduce lagged GDP. Macroeconomic fluctuations may be perceived with a delay or their impact on SWB could depend on longer-term trends rather than on current economic conditions.[19] Lagged macroeconomic variables can also relate to adaptation effects (Di Tella et al. 2010, Di Tella et al., 2003), stemming from the idea that migrants may adjust to the home country GDP after a period of time and thereafter only derive negative positional

level shocks or social multipliers (peer effects) in happiness.

[18] Sample size is reduced given the fact that the "big five" are available for only two years, so that linking them to past years through panel identifiers leads to inevitable backward attrition. Note that these traits can be considered as an individual fixed effect as they are shown to be constant over time (Cobb-Clark and Schurer, 2012).

[19] The timing of measurement of GDP and SWB variables may also be an issue. SWB information is collected mostly in the first half of the year (Spiess and Kroh, 2004); however, it is unlikely that migrants have good anticipation about the overall level of GDP in their home country for the current year. It might be reasonable to consider that $GDP_{h,t-1}$ is more closely associated with migrants' perception.

feelings from increases in GDP. Columns 3 and 4 show results with 1-year and 2-year lags of GDP respectively. Di Tella et al. (2010) interpret the sum of lagged effects as the amount of adaptation. We observe that lagged GDP effects change sign and are insignificant; yet an F-test of whether the joint effect of all GDP variables (i.e., current or lagged) is zero can be rejected. With one lag (two lags), 26% (14%) of an initial increase of GDP is lost over the ensuing year(s), leaving a long lasting effect of $-.310$ ($-.384$) on SWB, which is very similar to our baseline result. In terms of equivalent income, the cumulated effects of current and lagged GDP are $-.79$ ($-.98$) with one lag (two lags), again similar to the baseline. We draw two lessons from these results. First, it is obviously not possible to identify the precise timing due to the high correlation between $GDP_{h,t}$, $GDP_{h,t-1}$ and $GDP_{h,t-2}$. This is no impediment to our analysis, as cumulated effects do not change our conclusions. Second, we find no evidence of an adaptation effect to individual positional concerns towards the home country. If any, this is a very partial adaptation process, which is consistent with the findings in Di Tella et al. (2010) or Ferrer-i-Carbonell and van Praag (2008). These authors show that while people adapt almost fully to changes in absolute living standards, they do not (or only partly) adapt to changes in status.

Effect of GDP: Home versus Host Regions. Baseline estimations reveal the existence of highly significant status concerns with respect to home country GDP per capita. Let us view them in a broader perspective using a stylized model inspired by Clark et al. (2008). Assume that an individual's SWB depends on her income, y, the mean income of her *local* reference group (destination country or region), $\overline{y_l}$, and the mean income of her *external* reference (origin country or region), $\overline{y_e}$, so that:

$$\begin{aligned} SWB &= \beta_1 \ln(y) + \beta_2 \ln(\frac{y}{\overline{y_l}}) + \beta_3 \ln(\frac{\overline{y_l}}{\overline{y_e}}) \\ &= (\beta_1 + \beta_2) \ln(y) + (\beta_3 - \beta_2) \ln(\overline{y_l}) - \beta_3 \ln(\overline{y_e}). \end{aligned}$$

We have mentioned Akay et al. (2012) who unveil migrants' strong competing feelings toward their rural regions of origin ($-\beta_3 < 0$) in the case of internal migrants in China. This study also showed that migrants experience a positive feeling from the mean income of the urban regions where they stay ($\beta_3 - \beta_2 > 0$). This last result was interpreted as a *signal effect*, meaning that urban residents' higher incomes may be informative about migrants' own future income (see also, Senik, 2004, 2008; Ravallion and Lokshin, 2000). We can test similar effects with international migrants if we dispose of enough variation in regions of origin, as we have exploited in the present study, and regions of destination. For the latter, however, all migrants in our sample live in Germany. Nonetheless, we can exploit variation in economic performances across German regions. We do so by collecting regional statistics at a fairly disaggregated level, namely 96 German districts known as ROR (*Raumordnungsregionen*). We match unique information about ROR economic

performances with our micro data.[20]

We first replace our usual GDP measure by the difference $GDP_{h,t} - GDP_{ROR,t}$. The former component, the usual log real GDP per capita of home country h, is a proxy for log mean income of the external reference group, $\ln(\overline{y_e})$. The latter, corresponding to the log real GDP per capita of the ROR where the migrant lives in year t, is a proxy for the log mean income of the local reference, $\ln(\overline{y_l})$. Results in column 5 of Table 3 show a negative and highly significant effect of the *relative* home country GDP per capita. In a more flexible specification, we separately introduce $GDP_{h,t}$ and $GDP_{ROR,t}$. Results in column 6 confirm that the effect of home country GDP per capita, $-\beta_3$ in the simple model above, is negative and of very similar magnitude as in the baseline ($-.207$). ROR information is unfortunately limited to 12 years, 1998-2009, which reduces the sample to around $21,145$ migrant-year observations. As a result, the effect is insignificant in this specification (an additional, unreported estimation of the baseline model, i.e. with $GDP_{h,t}$ only, on this sub-sample yields a similar GDP effect of $-.213$ with a p-value of .17). Nonetheless, the effect of ROR-level German GDP, $\beta_3 - \beta_2$, is positive and significant (.163), which is consistent with an interpretation in terms of signal effect. That is, while we already control for the absolute economic performance of each migrant through her income and labor market status, local economic conditions may additionally be perceived as a reflection of individual future prosperity and affect migrants' well-being positively.[21]

Price Effects. In place of real GDP, it would make sense to include log nominal GDP per capita, denoted $GDP^{nom}_{h,t}$, to check if migrants are to some extent victims of monetary illusion. Yet, since $GDP^{nom}_{h,t} = P_{ht} + GDP_{h,t}$, with P_{ht} as the log price index (log GDP deflator), we can simply introduce the latter in the SWB regression together with $GDP_{h,t}$. Column 7 in Table 3 shows that the effect of log real GDP per capita is unchanged while the log price level has no significant effect. This conveys that real GDP is what truly matters for well-being. If this is the case, an alternative specification including log nominal GDP per capita, $GDP^{nom}_{h,t}$, and log prices should give a negative coefficient on the former and a positive coefficient, of similar magnitude, on prices. That is, migrants should be affected by the success of their home country in terms of

[20] Each ROR is a spatially organized unit based on various criteria to represent local markets (Knies and Spiess, 2007). Regional GDP per capita is drawn from official statistics, which substantially attenuates measurement error issues. Details about ROR data are available at http://www.bbsr.bund.de/BBSR/DE/Veroe entlichungen/INKAR/inkar node.html.

[21] To some extent, this result is reminiscent of that in Di Tella et al. (2002) who find that citizens are positively affected by the economic performances of the country/region where they live, possibly through feelings of identity and national prestige. In the same vein, a positive relative concern – at a more local level – can be interpreted as a sign of tight community ties and altruistic preferences. Evidence exists for poor rural households (for instance in South Africa, see Kingdon and Knight, 2007). This interpretation is less likely to apply to our migrants, even if it remains a possibility, and the signal effect seems to us a better explanation in the present context.

nominal GDP, but they should also know that a price increase in their home country reduces their relative deprivation as it decreases the relative cost of living in Germany. This is indeed what we find in column 8. Even if not a definitive proof, this evidence is suggestive that migrants do not suffer from monetary illusion (see also Deckers et al., 2011, using regional price variation within Germany and Di Tella et al., 2010, on measuring aversion to monetary inflation using SWB).[22]

Table 3: Effect of Home-country GDP on Migrant SWB: Micro Data (cont.)

SWB micro estimations	1	2	3	4	5	6	7	8
GDP		-0.312 ***	-0.421 *	-0.448 *		-0.207	-0.281 ***	
		(0.117)	(0.216)	(0.229)		(0.158)	(0.104)	
Nominal GDP								-0.287 ***
								(0.104)
ΔGDP	-0.138	-0.130						
	(0.166)	(0.166)						
GDP (t-1)			0.111	0.296				
			(0.188)	(0.288)				
GDP (t-2)				-0.231				
				(0.184)				
GDP(home) - GDP(Germany) (a)					-0.169 ***			
					(0.059)			
GDP (Germany) (a)						0.163 **		
						(0.064)		
Prices (GDP deflator)							0.066	0.347 *
							(0.151)	(0.178)
GDP (equivalent income)		-0.793	-1.070	-1.144		-0.570	-0.713	
GDP (equiv. inc. cumulated)			-0.789	-0.978				
R2 or pseudo-R2	0.284	0.284	0.284	0.285	0.324	0.324	0.284	0.284
# observations	47,557	47,557	47,557	47,557	21,145	21,145	47,557	47,557

Note: *, **, *** indicate significance levels at 10%, 5% and 1% respectively. Linear estimations performed on migrants from 24 countries over 26 years. GDP refers to log of real GDP per capita, taken from World Bank indicators. Subjective well-being (SWB) taken from the German Socio-Economic Panel. (a) GDP(Germany) refers to the log GDP per capita of at the district (ROR) level. All models include the full set observed characteristics reported in appendix Table A.2, as well as quasi-fixed effects (QFE), Cohort fixed effects (10 arrival cohorts), state effects (16 federal states of Germany), year fixed effects and home country fixed effects.

Unemployment. We finally turn to the effect of home country unemployment rates. We first use a simple linear model without QFE. Column A in Table 4 reports a positive and significant effect, about a third or a fourth of the size found in grouped estimations. Column B presents results when unemployment and $GDP_{h,t}$ are introduced simultaneously. The relation between unemployment (resp. $GDP_{h,t}$) and migrants' SWB is still positive (resp. negative) and significant.

[22] Other interpretations should nonetheless be mentioned. In particular, migrants from countries with lower relative prices could take advantage of the relative higher purchasing power of their income when they go home on holidays. In this case, higher prices in the home country should decrease rather than increase SWB, an effect that may partly counteract the relative concern effect described above. Note, however, that migrants could equally go to any other low-price country to take advantage of their German salaries.

This result implies that the level of unemployment in the home country is another reference standard, conditional on the migrant's work status. Yet, we notice that when individual effects are introduced (columns C and D), the unemployment effect becomes smaller and insignificant (the GDP effect is basically unchanged). A less pronounced unemployment effect (compared to the GDP effect) could be explained by the fact that it is the mixture of two opposite forces: competing feelings with home countries (as in the GDP effect) but also an opposite effect related to migrants' own labor market prospects in case of return migration. Another explanation is the fact that informal work might be a more relevant measure than unemployment for the poor countries sending migrants to Germany. Finally, columns E and F show results with 1-year and 2-year lagged unemployment rates respectively. While estimates are usually insignificant, their cumulative effects amount to an order of magnitude close to a contemporary effect (between .005 and .008), which is consistent with the lack of adaptation to relative labor market status discussed above and established in Di Tella et al. (2010) and Ferrer-i-Carbonell and van Praag (2008).

Table 4: Effect of Home-country Unemployment on Migrant SWB: Micro Data

SWB micro estimations	A	B	C	D	E	F
Unemployment rates	0.011 ***	0.009 **	0.006	0.004	0.009	0.011 *
	(0.004)	(0.004)	(0.004)	(0.004)	(0.006)	(0.007)
Unemployment rate (t-1)					-0.002	0.004
					(0.006)	(0.009)
Unemployment rate (t-2)						-0.010
						(0.007)
GDP		-0.374 ***		-0.376 ***		
		(0.115)		(0.144)		
Individual effects (a)	No	No	Yes	Yes	Yes	Yes
Cohort fixed effects (b)	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects (c)	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Home country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.289	0.289	0.284	0.284	0.284	0.285
#Observations	47,557	47,557	47,557	47,557	47,398	47,231

Note: *, **, *** indicate significance levels at 10%, 5% and 1% respectively. Linear estimations performed on migrants from 24 countries over 26 years. All models include the full set observed characteristics reported in appendix Table A.2. Unemployment rates and GDP (referring to log of real GDP per capita) are taken from World Bank indicators. Subjective well-being (SWB) taken from the German Socio-Economic Panel. Other controls include: (a) Unobserved individual effects modeled as quasi-fixed effects (QFE), (b) 10 arrival cohort effects, (c) 16 federal states of Germany.

3.3 Sensitivity Analysis

Origin Country and Year Selection. We investigate the sensitivity of our results to country and year selection. First, the Turkish migrants are by far the largest group among all migrants in Germany (25.1% of the total foreign population, see Table A.1). We check whether results still

hold without this group and whether time variation within this group alone generates the effect. Results are reported in columns (a) and (b) of Table 5. The effect of $GDP_{h,t}$ is negative and significant. It is very similar to the baseline in the model without Turkey, conveying that results are not driven by Turkish migrants alone. It is larger, but less precisely estimated, when using only time variation among Turkish migrants.[23]

Next, we check whether the effect varies with the geographical distance to Germany. Closer countries are in general richer (so that the rate through which they may converge towards German GDP is lower), as well as more politically and economically integrated. Hence, the effect may not be as pronounced as with Eurasian countries. Countries located farther away also make circular migration more difficult, especially in the early years of our panels during which possibilities of air travel were not as developed as today. Columns (c) and (d) in Table 5 show estimates using a threshold of 2,100 kilometers from Germany (the median), which excludes countries like Turkey, Iran, Ukraine and Russia. As conformed to intuition, the effect is larger in the more distant group, but not significantly so, compared to countries in the vicinity of Germany.

Finally, we verify if selected years also make a difference. As previously seen in Figure 1, most countries in our sample experience economic growth for a majority of the years 1984-2009. We investigate whether our results are driven by these episodes of growth or whether recession years tell us a similar story. While upturns in home countries are expected to trigger relative concerns among migrants, downturns may have an asymmetrical effect if migrants experience more sympathy toward their nation during bad years. We interact macroeconomic conditions with dummy variables for upward or downward changes in these variables. The results are reported in columns (e) and (f) of Table 5. Both upward and downward changes in the home country GDP affect migrants' well-being. While the effect generated by economic downturns in home countries is smaller, as conjectured above, the difference with upturns is neither large nor significant. More asymmetry is observed on the side of unemployment rates (not reported): the effect in this case is significant for growth years but not for recession years. Column (g) examines the impact of the recent economic crisis. Results do not greatly vary from the baseline after excluding the years 2008 and 2009 from our sample. Additional unreported results show little contrast between migrants living in East and West Germany. We also find that excluding East Germany does not affect our conclusions.

Destination Country. Previous checks varied the selection of origin countries. Of course it would be interesting to also change the destination country. Our data requirement consisted in

[23] The effect of the unemployment rate is also comparable to the baseline, yet it is not significant in the reported estimates, possibly due to smaller sample size. It is nonetheless significant in a less demanding specification without individual QFE.

Table 5: Effect of Home-country Macroeconomics on Migrant SWB: Sensitivity Check

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
	All countries but Turkey	Only Turkey	Distance to Germany		Checking for asymmetrical effects:		Without recession years 2008-2009	Results for the UK (BHPS)
			<median	>median	upward trends	downward trends		
GDP	-0.285 **	-0.477 *	-0.262 **	-0.331 **	-0.280 ***	-0.254 **	-0.210 **	-0.255 **
	(0.111)	(0.260)	(0.110)	(0.160)	(0.106)	(0.113)	(0.106)	(0.126)
GDP (equiv. Income)	-0.784	-1.361	-0.703	-0.888	-0.713	-0.647	-0.531	-0.645
R2	0.286	0.269	0.284	0.284	0.284	0.289	0.283	0.191
# obs.	31,303	16,254	47,557	47,557	47,557	47,557	44,831	6,555

Note: *, **, *** indicate significance levels at 10%, 5% and 1% respectively. Estimations include all personal characteristics, individual effects (QFE), year fixed effects, home country fixed effects, cohort effects and German state effects (British districts in column h). GDP denotes log real GDP per capita.

the search of a country with a large and diverse migrant population, for which long panels were available and with information on SWB and macroeconomic conditions. The GSOEP verified these conditions and has therefore been used for our main analysis. Nonetheless, we suggest here a tentative robustness check using another country, the UK. This country is characterized by a very different immigration history compared to Germany, with substantial migration flows since 1945 from the Republic of Ireland and from the former colonies and territories of the British Empire such as India, Bangladesh, Pakistan, the Caribbean, South Africa, Kenya and Hong Kong. More recent immigration concerns workers from Central and Eastern Europe following the accession to the European Union of eight countries from this region. A bit less than 5 million people living in the UK are foreign-born. We retain data from migrants present in the BHPS over the years 1991-2008 and for 26 countries of origin (we keep countries with enough observations). Once discarding migrants for whom SWB information is missing, we are left with $6,555$ migrant$\times$year observations. While this is a much smaller sample than in our analysis on German data, the results of the baseline model reported in column (h) of Table 5 are striking. The GDP effect is again negative and significant, of a magnitude very much in line with what we found for Germany. Results for the UK may be seen as suggestive evidence, given the lower data quality. They nonetheless indicate that the findings for Germany can be generalized. Further research should attempt to replicate this approach to many more countries.

Non-Economic Outcomes. We have narrowed our empirical quest to the effect of economic conditions in home countries on SWB. While the impact may well be due to motives of relative deprivation/concerns, as we argued, these may not extend to non-economic dimensions. We have speculated above that shocks to the home country of a non-economic nature may evoke the expected sympathy with the origin country and thus have an opposite effect. We now test this

hypothesis by using a series of three indicators related to actual and potential conflicts as well as long-term life conditions in the home country. Precisely, we perform separate estimations of the effect of battle-related deaths (log number of people), military expenditures (in % of GPD) and life expectancy (number of years) on migrants' SWB, using the same controls as in the baseline model. We find estimates of -0.014 (standard error of .006), $-.050$ (.011) and .014 (.009) respectively, i.e. significant effects which denote migrants' feelings of sympathy towards their home countries when it comes to non-economic domains. When we include these variables together with $GDP_{h,t}$, their coefficients are basically unchanged while the GDP effect is very similar to our usual results, i.e. a significant negative effect.

3.4 Alternative Interpretations

Di Tella et al. (2003) discuss the possible endogeneity of national GDP effects on citizens' life satisfaction. They reckon that it is difficult to find believable macroeconomic instruments and suggest to instead experiment with different forms of lag structures. In the present context, there is much less concern for endogeneity given the minimal influence of migrants on their home country's GDP. Nonetheless, relative changes in home country GDP may affect migrants through three other channels besides positional concerns, namely migration flows, remittances and the option to return home. We now investigate whether these variables challenge our interpretations by responding themselves to country-of-origin conditions.

Inflow of Country-Fellows. A potential effect of bad economic conditions in the home country is that more potential immigrants from that country may be interested to migrate to Germany. Possibly they migrate to the same regions where their co-nationals already live. In this case, an increased flow of new migrants may enhance the well-being of existing migrants. Additional, unreported estimations depart from our baseline model by including the proportion of immigrants in local labor markets. They show no effect of the latter while the effect of $GDP_{h,t}$ is basically unchanged. This is also true when we include ROR fixed effects to account for time-invariant labor market conditions and capture changes in migrants' proportions (see Akay et al., 2013, for a more detailed analysis). More generally, the formation of enclaves requires long lasting dynamics, probably mixing people of different nationalities. Also, migration inflows cannot respond freely to changes in home country economic conditions simply because of changes in migration policies. While the earlier cohorts of immigrants in Germany were attracted by the 'guest workers' program, immigration became more restricted after the program was formally closed in 1973 (immigration to guest workers regions continued through other channels such as family reunification but became more strictly regulated).

Return Migration. A second channel is return migration, which we treat as a more serious challenger in terms of result interpretation. Indeed, the potential return decision concerns each migrant directly. We first empirically check whether return migration depends on changes in the home countries' macroeconomic performances.[24] We suggest the following model:

$$r_{iht} = \mathbf{1}(X_{it}.\eta + \mu.Macro_{ht} + \nu_i + \xi_h + \pi_t + \upsilon_{iht} > 0), \tag{3}$$

where r_{iht} is an indicator variable taking value 1 if migrant i from country h leaves Germany in year t (and drops from the panel for this reason), and 0 otherwise. The model combines individual characteristics, X_{it}, including cohort and state fixed effects, a macroeconomic index of the home country, $Macro_{ht}$, individual effects (modeled as QFE), ν_i, country and time fixed effects, ξ_h and π_t respectively, and an i.i.d. normally distributed random term. Appendix Table A.3 (left panel) reports estimates of μ for our usual macroeconomic variables (log real GDP per capita and unemployment rates), either contemporaneous, lagged or lagged time variation. Estimates are obtained in each case with a separate regression.[25] Results suggest that home country GDP increases the probability of return but is not significant. We obtain the same conclusion with lagged GDP. Only the lagged change in GDP, i.e., $GDP_{h,t-1} - GDP_{h,t-2}$, is found to significantly affect the probability of return in year t. We also find no effect of current or previous year unemployment rates on the decision to return.

Next, we re-estimate SWB regressions accounting for possible return – and non-random sample attrition due to return migration – as a function of home country macroeconomic conditions. We use the Heckman procedure adapted to panel data by simultaneously estimating selection into return migration and the SWB equation by Maximum Likelihood (for a more structural approach, see Bellemare, 2007). Ideally, the selection equation should contain an instrument explaining variation in migrants' likelihood to return but uncorrelated with (conditional) migrants' SWB. There is no obvious variable of the kind, as virtually everything can potentially affect well-being. We use a first series of instruments based on the migrant's declared intention to stay in Germany (contemporaneous, lagged and time change of this intention). We also follow Dustmann et al. (1998) by using the average intention to stay over all migrant's household members (also as contemporaneous, lagged or time difference), which is expected to be more exogenous but possibly

[24] A rare feature of the GSOEP is the considerable effort put into investigating the causes of panel attrition in a whereabouts-study. This means one can distinguish between households moving within Germany and households going abroad (which we define as return migration) from other attrition causes.

[25] In these estimations, other determinants of return migration are in line with intuition (detailed estimates available from the authors). In particular, the probability of return increases very significantly when the spouse and close relatives remain in the home country, with the level of remittances and with declared intention to stay. Conversely, the probability of return decreases significantly with years since migration or when migrants are refugees.

less relevant as an instrument. Columns 2 and 3 of Table 6 report the estimates of the different instruments and of $GDP_{h,t}$ on the propensity to return. All instruments have a significant impact and the expected sign (F-tests pass the threshold of 10 commonly used for checking if instruments are weak). The third column shows that $GDP_{h,t}$ once again has a positive but insignificant effect on the probability of return. The first column of Table 6 reports the effect of $GDP_{h,t}$ on migrants' SWB when controlling for selection into return migration. It is very much in line with baseline results and significant in all cases. The correlation ρ between the residuals of the two equations is significantly different from zero only when the instrument used is the contemporaneous intention to stay (the migrant's intention or the mean answer for her family).

Remittances. Remittances constitute a third channel linking migrants to their home countries. Remittances sent by migrants can directly affect home country macroeconomic conditions and influence, at the same time, their own well-being. The latter effect is of significant magnitude only for a limited set of countries and years. This concerns especially Turkey, given the size of its migrant community in Germany. For instance in 2002, remittances sent by Turkish migrants living in Germany accounted for 0.4% of the total GDP of Turkey. We have checked above that our results are not driven by this country, however. Moreover, our GDP measure already includes total annual remittances received by migrants from Germany and from all other destination countries.[26]

We further explore the effect of GDP variation on migrant SWB through the channel of remittances. First, if per capita income in the home country increases, migrants may need to compensate their relatives left behind less and, hence, their SWB would increase (a downward bias on our effect). To check this, we have run estimations of the probability to send remittances on individual characteristics, as specified in the right panel of Appendix Table A.3. In this table, we report the effect of macroeconomic variables only. It shows that the probability of remitting significantly depends on the contemporaneous level of unemployment but not on the current GDP level nor on lagged variables. Second, even if the remittance levels do not respond much to home country economic conditions, their implicit value may change with it. If economic conditions improve, migrants' status may decrease to the extent that their role as supporting their extended family or local communities in the origin region becomes less prominent (an upward bias of our effect). Conversely, worse conditions could increase the purchasing power/value of any amount of remittance sent to the country of origin, and be a source of increased well-being for immigrants thereof. Replicating our estimations on migrants who do not send remittances provides results that are very similar to the baseline, however. This conveys that the channel of remittances does not affect

[26] Specific information on remittances sent by migrants in Germany to various home countries could be collected to account for the direct variation in GDP due to remittances in SWB regressions. Note that this is already captured by country-year dummies in our augmented specification and that our main results were hardly changed in this case.

our results nor our interpretation in terms of relative concerns/deprivation. Finally, it is worth noting that while our baseline estimations already control for the amount of remittances sent by migrants, we find hardly any difference in terms of both GDP and unemployment effects whether we include this variable or not.

Table 6: SWB Estimations Corrected for Selection into Return Migration

SWB estimation with Heckman correction for return migration	SWB equation	Propensity to return equation			
	Coeff. on GDP	Coeff. on instrument	Coeff. on GDP	Rho	# obs.
Instrument: Migrant's intention to stay					
Intention (t)	-0.245 ***	-0.395 ***	0.065	0.085 **	47,568
	(0.095)	(0.019)	(0.134)	(0.036)	
Intention (t-1)	-0.314 ***	-0.336 ***	0.116	0.007	40,961
	(0.099)	(0.021)	(0.146)	(0.036)	
Intention (t) - Intention (t-1)	-0.316 ***	-0.064 ***	0.094	-0.005	40,961
	(0.099)	(0.021)	(0.145)	(0.038)	
Intention (t-1) - Intention (t-2)	-0.254 **	-0.052 **	0.100	-0.021	35,664
	(0.105)	(0.022)	(0.157)	(0.043)	
Instrument: mean intention to stay of migrant's household					
Intention (t)	-0.249 ***	-0.460 ***	0.071	0.062 *	47,568
	(0.095)	(0.021)	(0.135)	(0.034)	
Intention (t-1)	-0.316 ***	-0.397 ***	0.123	-0.008	40,961
	(0.099)	(0.023)	(0.146)	(0.035)	
Intention (t) - Intention (t-1)	-0.316 ***	-0.086 ***	0.092	-0.005	40,961
	(0.099)	(0.024)	(0.145)	(0.038)	
Intention (t-1) - Intention (t-2)	-0.254 **	-0.066 ***	0.099	-0.021	35,664
	(0.105)	(0.026)	(0.157)	(0.043)	

Note: *, **, *** indicate significance levels at 10%, 5% and 1% respectively. SWB equation estimated linearly on microdata using baseline specification and additionally accounting for Heckman correction for non-random selection into return migration (ML estimation). Selection based on a dummy variable for return migration. Different rows report results for alternative instruments in the selection equation. Instruments are based on the migrant's intention to stay or her household mean intention to stay. Rho is the correlation between the two equations.

3.5 Heterogeneity among Migrants

We now examine how the migration history of migrants and their connection to home countries may affect the results. To capture migrants' heterogeneity, we linearly interact the main macroeconomic variable, log real GDP per capita, with a series of characteristics H_{it}. In other words, we replace γ by $\gamma^0 + \gamma H_{it}$ in model (2). Variables in H_{it} include migrants' duration of stay (years-since-migration) and a set of characteristics on intentions to stay in Germany, objective and subjective measures of assimilation and attachment to host versus home countries.

Duration of Stay. We first check how duration into migration influences the GDP effect. We use a flexible specification with four groups of year-since-migration interacted with the GDP coefficient, namely less than 10 years, 10-20 years, 20-30 years and more than 30 years. The results are reported in Figure 3. The effect of the home country GDP per capita is negative and very large ($-.531$) in the first 10 years, further decreases during the next 10 years after arrival ($-.635$), then becomes virtually zero in the following years (i.e., positive but insignificant). That the effect of the home country GDP only affects migrants' SWB in the first 20 years after arrival can be interpreted in five different and non-exclusive ways: (i) after some years, as migrants assimilate into the host country, the effect of the home country GDP as a reference group fades away; (ii) migrants who arrived young in the host countries are more assimilated and ignore their home country as a reference point; (iii) the composition of the migrant community changes over time due to cohort effects (new comers, migrating due to family reunification, are less likely to assimilate compared to first round migrants who were more economically assimilated, cf. Borjas, 1999); (iv) the composition of the migrant community changes over time due to return migration (those experiencing greater relative concerns are more likely to eventually return to their home countries and disappear from our panel); (v) relative concerns are replaced by a signal effect as migrants get closer to a potential return to their home countries (when this moment occurs, the success of their home country becomes a signal of their own future prosperity, cf. Senik, 2004, 2008; Akay et al. 2012; and our previous discussion).

While it is not possible to discriminate completely between these interpretations, we argue in favor of explanations (i) and (ii). Our reasoning is as follows. First, regarding (iii), it is true that the historical patterns of migration to Germany shows large variation over time. The majority of earlier cohorts of immigrants moved to Germany through the bilateral guest-worker programs from partner countries such as Turkey, Italy and Greece. Thus, one may argue that the nature of the migrants may have changed over time. Yet, we control for unobservable differences between different migrant cohorts by using arrival cohort fixed effects in our baseline estimations. We also control for individual heterogeneity among all migrants regarding their economic assimilation by including labor market outcomes in the regression as well as individual fixed effects.[27]

Second, explanations (iv) and (v) are related to return migrants. A possible confounding factor is the mere fact that return migration may depend on the differential GDP between Germany and the home countries. We have formally investigated this issue in the previous sub-section and found that accounting for non-random return migration did not change our result at the mean. In addition, the short-dashed line in Figure 3 plots the GDP effect estimated on a sub-sample

[27] Nonetheless, a composition effect due to cohort heterogeneity is complementary to the first two explanations since "cohorts' quality" in (iii) and years-since-migration in (i) or age in (ii) all act in the same way, i.e., contribute to create heterogeneity among migrants in terms of their degree of assimilation.

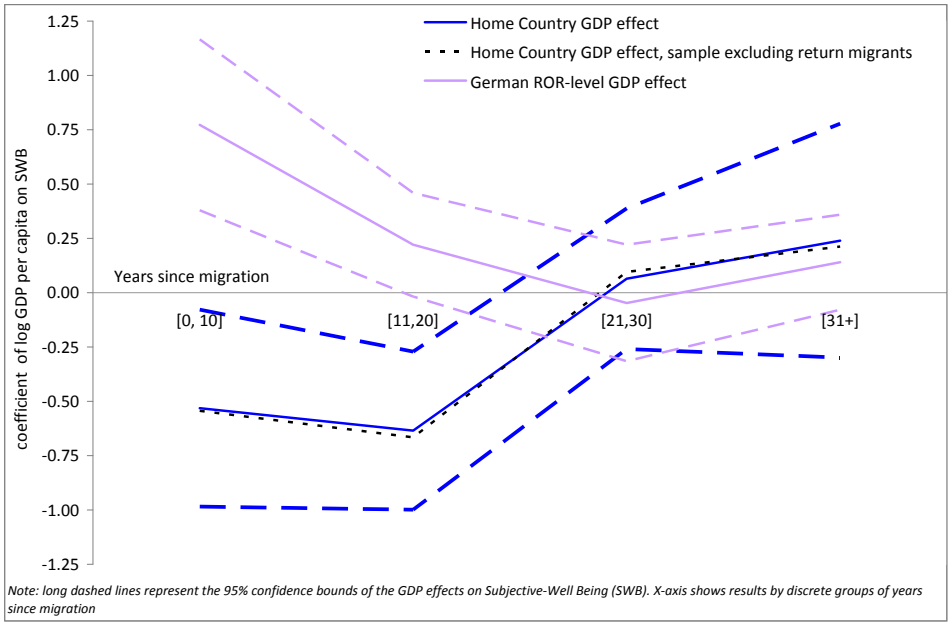


Figure 3: Effects of Home GDP versus Local German GDP on migrants' SWB according to Years-since-Migration

excluding all the observations for those who return to home countries at some point in the panel (930 return migrants over the period of study and 6,118 individual-year observations). The results are basically unchanged. The overall effect for "stayers" is slightly lower ($-.256$) than for the whole sample ($-.288$), yet the difference is not at all significant. Hence, we conclude that the influence of returns, either through a composition effect (iv) or a switch to a signal effect when the time of return migration has come (v), is negligible. It is more likely due to an assimilation process (i) in which migrants gradually abandon the home country as a primary comparator.

Assimilation and Connection with Home Countries. To go one step further, we explore the nature and the implications of such an assimilation process that could explain the pattern in Figure 3. First, in a close interpretation (ii) mentioned above, the lower effects for those who have stayed longer could simply reflect the fact that they arrived when they were children and, hence are more closely attached to Germany and disconnected from home countries. Therefore, we have interacted GDP with dummies for the age range at which migrants arrived in Germany: as children (under 12), as teenagers (12-18), as young adults (18-39) or older. Results are not inconsistent with this explanation. While those who arrived as children are not affected by home country GDP, the GDP effect remains significant at older ages (12-18 and 18-39). An exception is the last group, those arrived at age 40+, for which the confidence interval fans out due to a smaller sample size.

Second, the assimilation process may have more implications than just "forgetting" home countries. It may also imply a switch in the reference group over time, with the *local* group becoming the new natural comparator for long-term migrants. If this is the case, the effect of German ROR-level GDP may be expected to become insignificant or even negative as the signal effect exhausts over time and is replaced by relative concerns vis-à-vis the migrant's new local environment. The purple curve in Figure 3 shows this, i.e. a decline of the signal effect over time, symmetrically to the decline in competing feelings vis-à-vis home countries. We believe that such suggestive evidence of a switch in reference groups is original in the literature.

Third, we investigate the assimilation interpretation in a more qualitative way. We estimate the potential heterogeneity of the GDP effect among migrants by using different proxies for their connection to home countries. If the assimilation story suggested to explain patterns in Figure 3 is relevant, we should find that migrants with little attachment to the home land, high degrees of assimilation in Germany or no intention to return show more moderate relative concerns. Therefore, we use a first variable to refer to the presence of a close family member who stayed behind. We also use subjective information on migrants' attachment to the host country ("*Do you feel like a German?*") and more objective measures of socio-cultural assimilation (language skills in both speaking and writing). We recover information on whether migrants have purchased their German dwelling, which may indicate a long-term commitment to stay. We finally use information about the intention to migrate back (using the variable mentioned above, we identify individuals who desire to stay forever in Germany as intentionally "permanent migrants" and the remaining ones as temporary migrants). Results are reported in Figure 4. The effect of GDP per capita on migrant SWB is ordered, for each of the questions above, from the highest to the lowest connection to the home country. Strikingly, all questions point to the same conclusion: Migrants characterized by high connection with their home lands – through having close relatives staying in the home country, low sentiment toward Germany, low social-cultural assimilation, or greater intentions to return – show greater relative concerns. Admittedly, the difference with other migrants is not significant when each item is taken separately. A joint test of all the characteristics is however significant, and the fact that all measures point to the same direction corroborates our interpretation: those who lose touch with the home land, intentionally or not, also treat it less as a reference point. This is highly consistent with the time pattern discussed above.[28]

[28] Additional results (available from the authors) on heterogeneous effects according to years-since-migration show similar patterns for migrants in the intermediate group (between 10 and 20 years of migration), which are the years during which relative concerns are the largest. For the early years (less than 10 years since migration), the pattern is also similar for questions regarding family members staying in the home country, language proficiency or intentions to return. We have also interacted GDP with other characteristics like gender, education level, refugee status, sending remittances, age and marital status. While women and refugees have slightly more relative concern, we did not find any significant differences between types or pattern that could easily be interpreted.

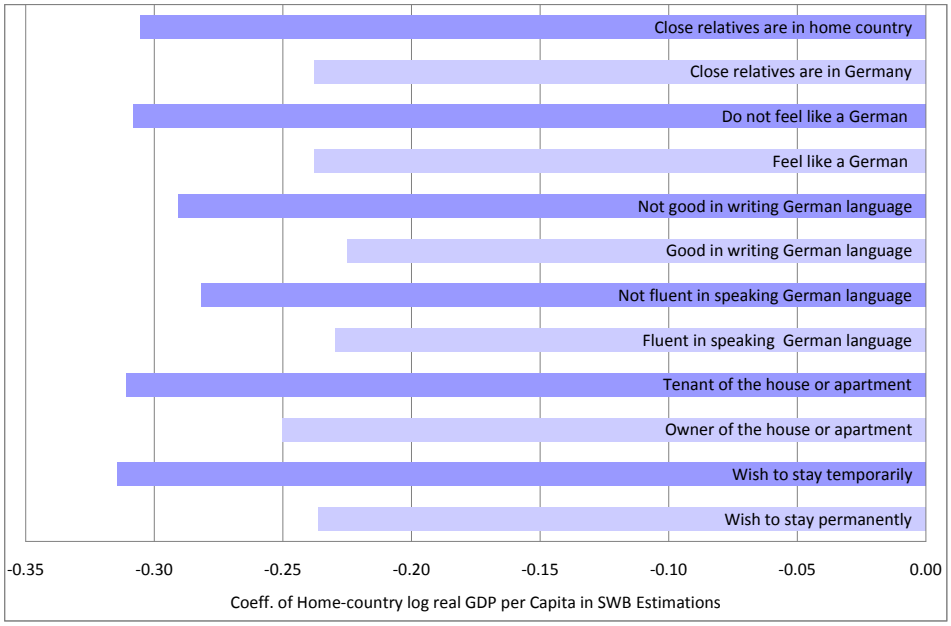


Figure 4: Effect of Home GDP on Migrant SWB: Heterogeneity

4 Concluding Discussion

In this study, we investigate whether a country's macroeconomic performances matter for those who have left the country. Using various groups of migrants in Germany observed over more than a quarter of a century, we find a significant and negative (positive) effect of home country GDP per capita (unemployment rate) on migrants' reported well-being. This result is robust to controls for observed and unobserved individual characteristics alongside various fixed effects for location in Germany, migration cohorts, home country, observation period and home country-specific time trends. The relation is causal and well explained by positional concerns and the related idea of relative deprivation of international migrants. Migrants leave their country to improve living conditions, potentially in relation to what they could have achieved in the home land.

The relationship between macroeconomic conditions in the home country and migrant SWB contribute to the so-called Easterlin Paradox (Easterlin, 1995). This paradox, i.e., the fact that SWB has not increased over the past 30 years despite substantial economic growth, is partly explained by relative concerns.[29] Our results very vividly illustrate the role of relative concerns in the case of migrants, consistent with the intuition of authors in the migration literature (for instance Stark and Taylor, 1991). For migrants, SWB trends are not even flat but SWB actually decreases as

[29] Stevenson and Wolfers (2008) find evidence that well-being has continued to grow with GDP, downplaying the Easterlin paradox. This is debated by Easterlin (2013) who argues that GDP and SWB are positively correlated only in the short-run while the correlation is nil in the long-term.

home countries do catch up with German GDP per capita. We demonstrate in this study that these trends in SWB and home GDP are not just two unrelated time trends: they are causally linked by the fact that origin countries' performances are a reference against which migrants assess their own well-being. Symmetrically, destination regions provide a signal of future prosperity as we find that migrants' well-being increases with local German GDP (disaggregated regional information). We also show that both relative concerns towards home countries and the signal effects from migration regions are stronger upon arrival or for those with a low degree of assimilation in Germany. These effects tend to disappear as migrants lose ties with home countries and take destination regions as new reference groups.[30]

We believe that these results are original and robust. While we see no strong objections against our empirical approach, some limitations are worth mentioning in order to suggest future research paths. First, we do not address the migration decision per se but in our empirical work, we do control for the possibility of return migration and for other ways through which macroeconomic performances in the home country correlates with migrants' well-being (e.g., remittances). In addition, we acknowledge the fact that migrants are a self-selected group within their country. Nonetheless, migrants in Germany constitute a very mixed population of guest workers, those moving due to family reunification, refugees, among others. We thus control for these characteristics in our estimations. Second, migrants may differ according to which regions they migrate to in Germany. This also should be captured in the various controls that we use and notably through the mix of cohort and region dummies. Yet, in the light of our results on the effect of German regional GDP, a more thorough investigation of destination choices is required. Third, our SWB-based test of the "relative deprivation hypothesis" is only partial. We simply test whether the migrant's relative position with respect to her origin country as a whole – proxied by GPD per capita – may have an effect on her well-being (the *international* relative deprivation according to Czaika and de Haas, 2012). We could not say anything about how migration improves the relative position of a migrant or her family *within* the home country income distribution (i.e., the *internal* relative deprivation hypothesis, as described in the studies of Stark and coauthors). Interestingly, this hypothesis potentially generates further testable implications. In particular, it implies that characteristics of the migrant's home country income distribution will influence the decision to migrate (or to return). Further research should attempt to gather more specific information on a migrant's expected labor income in the home country, on her family's position within the home country distribution and on how differential income growth between host and home countries affects this position.

[30]Note that a similar interpretation is also suggested in Nekoei (2013), who shows that immigrants' negative labor supply response to dollar appreciation is less pronounced for those who stayed long in the US and with loose ties to their home countries, i.e. a process of "disintegration" seen as a natural counterpart to the process of assimilation à la Chiswick.

Our results may have important implications for welfare measurement, labor markets and migration policy. First, our results imply that the welfare of migrants is not only a function of their economic conditions in the host country but also of the differential macroeconomic performances between the two locations. A higher degree of socio-cultural assimilation appears to decrease the welfare loss that the migrants experience due to such comparisons. The macroeconomic conditions in the home country are one of the most important sources of information to make a cost-benefit calculation not only for initial migration decisions but also for return migration decisions. We could examine how macroeconomic conditions of home countries affect "circular migration", which is an important phenomenon of the last decade (Constant et al., 2013). As noted by Clark et al. (2008), relative concerns can also explain why migrants continue to visit their home countries: this is when they can cash in as relatively high earners compared to those in the home country.

Second, when they essentially compare themselves to home countries rather than to local workers, migrants are all the more willing to accept low-paid or insecure jobs in the host country as they are less assimilated (this may be one of the contributory factors to the persistence of poverty in rich countries, cf. Karelis, 2007). This is at least true in the short run and, as we found, independently of education levels. It could indeed by hypothesized that low-skilled migrants from traditional communities could consider origin communities as their reference group more seriously and more persistently than highly skilled migrants, who are less relatively deprived in the first place and for whom reference group substitution is likely to occur faster due to easier economic assimilation (Czaika and de Haas, 2012). We found however no evidence that education affects the size of the GDP effect. It seems that in the longer term, a switch in reference is likely to take place also for lower skilled migrants, which might explain why the second generation often refuses to work in the same jobs their parents would have accepted.

Last, relative income effects suggest an original way to measure assimilation in relation to migration policy. Indeed, our approach may allow for the identification of two broad types of migration dynamics, as discussed in Clark et al. (2008). A first group would consist of high skilled migrants who voluntarily migrate and assimilate rapidly. Close to the modern brain drain view on migration and to the type of workers that are targeted by migration policy in Canada and the US, these migrants may not generate more migration as their reference group rapidly switches to the host region. In contrast, a second group coming from poor regions and less easily assimilated may keep home countries as the reference point and may try to attract other low-skill workers from the same origin country – as was the case with guest workers in Germany followed by a second migration round for family reunification. The second round workers do not detract from first round migrants' own status but rather increase it by reducing the reference income they face in the host country. The two types of migrants, associated with different income references, will have different economic and cultural implications for the host country.

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A Appendix

Table A.1: Statistics

Migrants from..	(Log) Real GDP	(Log) Nominal GDP	Real GDP: Country / Germany	Unempl. rate (%)	SWB (0-10)	correlation SWB & GDP	correlation SWB & unempl.	# Obs. (indiv. x year)
Turkey	9.0	8.6	0.29	8.6	6.7	-0.90	-0.40	16,924
	(0.2)	(0.5)	(0.05)	(1.5)	(2.0)			
Italy	9.8	9.6	0.64	8.6	7.0	-0.64	-0.34	5,123
	(0.1)	(0.3)	(0.10)	(1.3)	(2.0)			
Greece	10.1	9.9	0.84	10.1	7.1	-0.85	0.34	7,474
	(0.1)	(0.3)	(0.10)	(1.4)	(1.8)			
Poland	9.4	9.3	0.42	14.5	7.0	-0.55	0.04	4,082
	(0.2)	(0.3)	(0.08)	(3.9)	(1.8)			
Spain	9.9	9.5	0.68	18.4	7.4	-0.86	0.56	3,139
	(0.2)	(0.4)	(0.12)	(3.6)	(2.0)			
Russia	9.2	9.1	0.36	8.7	7.3	-0.63	0.47	2,636
	(0.2)	(0.4)	(0.08)	(2.0)	(1.7)			
Kazakhstan	8.8	8.8	0.25	9.7	7.3	-0.79	0.68	2,321
	(0.3)	(0.4)	(0.07)	(2.3)	(1.6)			
Croatia	9.4	9.3	0.44	13.3	6.8	0.00	0.59	1,920
	(0.2)	(0.3)	(0.08)	(2.9)	(1.7)			
Romania	9.0	8.9	0.29	6.9	7.2	-0.14	0.09	1,754
	(0.2)	(0.4)	(0.05)	(0.9)	(1.7)			
Bosnia-Herzegovina	8.5	8.4	0.18	29.7	6.8	-0.61	-0.28	1,023
	(0.4)	(0.5)	(0.05)	(3.5)	(1.8)			
Austria	10.3	10.2	1.04	4.4	7.4	0.42	0.48	768
	(0.1)	(0.3)	(0.14)	(0.7)	(1.7)			
Czech Republic	9.8	9.8	0.64	6.5	6.9	0.12	-0.46	541
	(0.1)	(0.3)	(0.09)	(2.0)	(1.9)			
Ukraine	8.5	8.4	0.17	8.9	6.9	-0.35	0.28	515
	(0.2)	(0.3)	(0.04)	(1.9)	(1.8)			
USA	10.6	10.5	1.34	5.6	7.5	0.12	-0.21	381
	(0.1)	(0.3)	(0.15)	(1.3)	(1.6)			
France	10.2	10.1	0.95	9.7	7.0	0.09	-0.37	379
	(0.1)	(0.3)	(0.09)	(1.5)	(1.7)			
Netherlands	10.4	10.3	1.13	5.0	7.6	-0.17	-0.01	363
	(0.1)	(0.3)	(0.15)	(2.5)	(1.3)			
Hungary	9.6	9.5	0.50	6.8	6.9	0.20	0.54	320
	(0.2)	(0.3)	(0.09)	(2.6)	(2.2)			
Great Britain	10.3	10.2	1.03	6.2	7.2	-0.62	0.45	311
	(0.1)	(0.3)	(0.13)	(1.9)	(1.8)			
Macedonia	8.9	8.8	0.25	34.1	6.5	-0.12	-0.29	264
	(0.1)	(0.3)	(0.03)	(2.3)	(2.0)			
Slovenia	9.8	9.7	0.66	6.9	7.3	-0.51	0.26	248
	(0.2)	(0.3)	(0.13)	(1.2)	(1.5)			
Iran	9.1	9.0	0.30	12.3	5.8	-0.06	0.22	200
	(0.1)	(0.3)	(0.04)	(2.2)	(2.3)			
Philippines	7.9	7.8	0.09	8.6	7.3	-0.52	0.39	187
	(0.1)	(0.3)	(0.01)	(1.4)	(1.7)			
Portugal	9.9	9.8	0.71	6.2	7.5	-0.69	-0.23	170
	(0.1)	(0.2)	(0.06)	(1.7)	(1.5)			
Bulgaria	8.9	8.6	0.26	12.0	7.3	-0.07	-0.21	128
	(0.2)	(0.3)	(0.05)	(5.9)	(1.7)			
Mean / total *	9.5	9.3	0.6	10.9	7.1	-0.34 [0.46]	0.11 [-0.40]	51,171
	(0.2)	(0.3)	(0.1)	(2.2)	(1.8)			
Germany	10.28	10.13		8.50	6.99			334,308
	(0.1)	(0.3)		(1.4)	(1.8)			

Note: GDP, unemployment and subjective well-being (SWB) figures are country average over 1984-2009. GDP (2005 PPP international dollars) and unemployment rate (annual) taken from World Bank Indicators, SWB from the German Socio-Econmic Panel. Standard deviations in brackets. Correlation between SWB and GDP (or unemployment rate) are calculated over the 26 years using mean SWB for each country-year. The correlations in square brackets in the Mean/Total row reflects both time and country variation (24×26 country-year cells).

Table A.2: Subjective Well-Being Regressions with Alternative Specifications

SWB micro estimations	0	I	II
Personal characteristics			
Log of HH income	0.390 ***	0.393 ***	0.398 ***
	(0.033)	(0.033)	(0.034)
Non-employed	-0.003	0.014	0.012
	(0.045)	(0.046)	(0.046)
Unemployed	-0.446 ***	-0.427 ***	-0.427 ***
	(0.055)	(0.056)	(0.056)
Old age/retired	-0.009	-0.007	-0.007
	(0.076)	(0.076)	(0.076)
In training/education	0.156 **	0.154 **	0.144 **
	(0.068)	(0.070)	(0.070)
Self-employed	-0.054	-0.058	-0.059
	(0.057)	(0.057)	(0.057)
Log of working hours	0.042 ***	0.045 ***	0.045 ***
	(0.012)	(0.012)	(0.012)
Age/100	-3.380 ***	-3.420 ***	-3.729 ***
	(0.797)	(0.799)	(0.814)
Age squared	1.727 **	1.802 **	2.152 **
	(0.819)	(0.820)	(0.843)
Years since migration (YSM)	0.273	0.605	0.803
	(1.084)	(1.094)	(1.145)
YSM squared / 100	0.029	-0.786	-1.449
	(1.189)	(1.224)	(1.373)
Female	0.130 ***	0.132 ***	0.138 ***
	(0.034)	(0.034)	(0.034)
Separated (a)	-0.487 ***	-0.499 ***	-0.503 ***
	(0.085)	(0.087)	(0.087)
Single (a)	-0.169 ***	-0.177 ***	-0.175 ***
	(0.050)	(0.050)	(0.050)
Divorced (a)	-0.346 ***	-0.355 ***	-0.365 ***
	(0.078)	(0.078)	(0.078)
Widowed (a)	-0.537 ***	-0.538 ***	-0.557 ***
	(0.092)	(0.094)	(0.094)
Health: poor (b)	0.767 ***	0.767 ***	0.765 ***
	(0.053)	(0.053)	(0.053)
Health: average (b)	1.395 ***	1.397 ***	1.394 ***
	(0.054)	(0.054)	(0.055)
Health: good (b)	1.950 ***	1.959 ***	1.955 ***
	(0.055)	(0.055)	(0.055)
Health: very good (b)	2.510 ***	2.519 ***	2.516 ***
	(0.059)	(0.059)	(0.059)
Log of HH size	-0.315 ***	-0.335 ***	-0.335 ***
	(0.051)	(0.051)	(0.051)
Years of education	-0.004	-0.004	-0.001
	(0.011)	(0.012)	(0.012)
Personal characteristics related to origin country			
One children with the migrant	0.118 ***	0.116 ***	0.116 ***
	(0.030)	(0.030)	(0.030)
Two children with the migrant	0.161 ***	0.162 ***	0.163 ***
	(0.038)	(0.038)	(0.039)
More than two children	0.251 ***	0.262 ***	0.261 ***
	(0.051)	(0.051)	(0.051)
Spouse in home country	-0.428 ***	-0.461 ***	-0.457 ***
	(0.111)	(0.113)	(0.113)
Other relative in home country	-0.029	-0.038	-0.043
	(0.045)	(0.044)	(0.045)
Migrant is a refugee	-0.033	-0.018	-0.014
	(0.049)	(0.049)	(0.049)
Log of remittances	-0.007	-0.005	-0.005
	(0.010)	(0.010)	(0.010)
Macroeconomic conditions			
GDP		-0.281 ***	-0.224 *
		(0.104)	(0.138)
Home country fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Home country x year fixed effect	No	No	Yes
R2	0.283	0.284	0.285
# observations	47,557	47,557	47,557

*Note: *, **, *** indicate significance levels at 10%, 5% and 1% respectively. All models include region effects (16 federal states or Länders of Germany), cohort effects (10 arrival cohorts, 5 years apart) and individual effects (quasi-fixed effects with Mundlak's formulation: within means of income, household size, age, remittances, education and working hours)*

(a) omitted category is "married"

(b) omitted category is "very poor"

Table A.3: Estimates for the Probabilities of Return Migration and Sending Remittances

	Prob. of Return	Prob. of Remit
GDP (t)	0.059	0.253
	(0.135)	(0.232)
GDP (t-1)	0.009	0.108
	(0.134)	(0.221)
GDP (t)-GDP (t-1)	0.202	0.347
	(0.259)	(0.426)
GDP (t-1)-GDP (t-2)	0.453 *	0.292
	(0.263)	(0.444)
Unemployment rate(t)	0.003	0.012
	(0.005)	(0.007)
Unemployment rate(t-1)	0.005	0.007
	(0.005)	(0.008)

*Note: *, **, *** indicate significance levels at 10%, 5% and 1% respectively. Both probability of return migration and probability of sending remittance are estimated by linear probability model (similar results obtained using probit estimation). Estimations include all personal characteristics, individual heterogeneity (QFE), year fixed effects, home country fixed effects, cohort and state fixed effects. Estimates for the different macroeconomic variables are obtained with separate regressions.*